TRUNK CHANNEL UNITS

OPTION SELECTION AND INSTALLATION

CONTENTS PAGE

1. GENERAL 1
2. CHANNEL UNIT LEVEL OPTIONS 1
4-WIRE 1
2- AND 3-WIRE 1
LEVEL OPTION FORMULAS 2
3. NETWORK BUILD-OUT CAPACITANCE OPTIONS 2
4. CGA OPTIONS 3
5. SIGNALING OPTIONS 3
6. BSY SWITCH OPTIONS 3
7. MISCELLANEOUS OPTIONS 3
8. INSTALLATION 3
9. OPTION SELECTION 3

1. GENERAL

1.01 This Section describes selection of the D448 trunk channel unit options and installation of the channel units.

1.02 This Section has been reissued to include information on channel units 628155 and 628156 and to revise the tables herein.

1.03 Selectable options are provided by screw-down option blocks, DIP switches or straps (0-ohm resistor). All options are located on the component side of the channel unit printed circuit board (PCB) and are accessible only when the unit is removed from the multiplex shelf.

1.04 A screw-down option is selected by turning the option screw fully clockwise (down) until the underside of the screw head makes firm contact with the two metal pins extending through the option block. Option screws that are not selected should be turned counterclockwise (up) 1-1/2 turns from the selected position. To prevent loss and permit future adaptation of the unit to other applications, complete removal of the option screws is not recommended. Strapping options consist of factory-installed straps which may be cut in the field. DIP switch options are selected by operating the miniature switches to the ON position (toward the option marking on the PCB).

WARNING 1: Too much torque on an option screw can split the option block. When selecting an option, care should be taken to make firm contact between the screw head and metal pins, without applying excessive torque to the option screw.

WARNING 2: This equipment contains static-sensitive (CMOS) devices. Section ITTR-18-599 contains handling instructions for CMOS-equipped units.

2. CHANNEL UNIT LEVEL OPTIONS

4-WIRE

2.01 D448 4-wire channel units are designed to operate with standard VF levels of (transmit) −16 dBm and (receive) +7 dBm. To compensate for differences in these levels caused by office wiring loss (OWL), 4-wire channel unit options provide up to 1.5 dB of gain in 0.1-dB steps. Transmit path gain is provided by the [TX] OWL options; receive path gain is provided by the [RX] OWL options.

2- AND 3-WIRE

2.02 D448 2- and 3-wire channel units are designed to operate with VF levels of (transmit) 0 dBm and (receive) −3 dBm. To compensate for differences in these levels caused by office wiring loss, 0.1-dB step [TX] and [RX] OWL compensation options are provided.

2.03 In addition to OWL options, 1-dB step [TX] and [RX] level options are provided. These options set the desired nominal VF levels in both the transmit and receive paths.

2.04 In the transmit path, the 0.1-dB step [TX] OWL and 1-dB step [TX] level options can be used in combination to provide proper compensation for inputs to the channel unit between 0 and −4.5 dBm. The 1-dB step [TX] level options provide for up to −3 dB and the 0.1-dB step [TX] OWL options provide up to −1.5 dB.

2.05 In the receive path, the 1-dB step [RX] level options are used singly to decrease the receive VF level up to – 6 dB. The 0.1-dB step [RX] OWL options *increase* the receive VF level up to 1.5 dB. In combination, the [RX] level and [RX] OWL options provide an overall range of – 6.0 to + 1.5 dBm. Refer to Table A and Fig. 1 for sample settings of D448 channel unit levels.

LEVEL OPTION FORMULAS

2.06 Formulas for determining [TX] OWL and [RX] OWL level settings on 4-wire channel units are as follows:

TX OWL setting = OWL
RX OWL setting = OWL

2.07 Formulas for determining level and OWL option settings for 2- and 3-wire channel units are as follows:

(Assume TLP equals a whole number — i.e., 1, 2, or 3 dBm)

TX level setting = TLP
TX OWL setting = OWL
RX level setting = TLP
RX OWL setting = OWL

(Assume TLP equals other than a whole number — i.e., 1.5, 2.7, or 2.8)

TX level setting = Next smaller number. (If TLP is 3.6, set [TX] – 3)

TX OWL setting = OWL plus difference between *set* TX level and actual TLP. (If OWL is 0.6 and TX level/TLP difference is 0.6, add together 0.6 and 0.6 (1.2), then set TX OWL to match the result — [TX] .8, .4)

RX level setting = Next larger number. (If TLP is 3.6 set [RX] – 4)

RX OWL setting = OWL plus difference between *set* RX level and actual TLP. (If OWL is 0.6 and RX level/TLP difference is 0.4, add together 0.6 and 0.4 (1.0), then set RX OWL to match result — [RX] .8, .2)

3. NETWORK BUILD-OUT CAPACITANCE OPTIONS

3.01 Network Build-Out Capacitance (NBOC) options are selected to match the capacitance build-out of the channel unit balancing network to the impedance of office terminating equipment and associated cabling. They are necessary on 2- and 3-wire channel units only, to maximize the transhybrid loss of the 2-wire/4-wire hybrid and thereby minimize echo and singing. All 2- and 3-wire channel units in any one office normally have the same NBOC values selected, unless cable lengths in the office

TABLE A

TYPICAL CHANNEL UNIT LEVEL SETTINGS

	OWL	TLP	SET OWL	SET LEVEL
4-Wire TX	0.6	– 16.0	[TX] .6	N/A
	0.8	– 16.0	[TX] .8	N/A
	1.2	– 16.0	[TX] .8, .4	N/A
4-Wire RX	0.6	+ 7.0	[RX] .6	N/A
	0.8	+ 7.0	[RX] .8	N/A
	1.2	+ 7.0	[RX] .8, .4	N/A
2-/3-Wire TX	0.6	– 2.0	[TX] .4, .2	[TX] – 2
	0.8	– 3.0	[TX] .8	[TX] – 3
	0.8	– 3.5	[TX] .8, .4, .1	[TX] – 3
2-/3-Wire RX	0.6	– 2.0	[RX] .4, .2	[RX] – 2
	0.8	– 3.0	[RX] .8	[RX] – 3
	0.8	– 3.5	[RX] .8, .4, .1*	[RX] – 4*

*To obtain – 3.5 TLP, next larger [RX] level option is selected, then difference between [RX] level option set and actual TLP is added to OWL. Total required gain is set using [RX] OWL options (3.5 from 4 equals .5, .5 plus .8 equals 1.3; therefore, set [RX] .8, .4, and .1 for a total of 1.3).

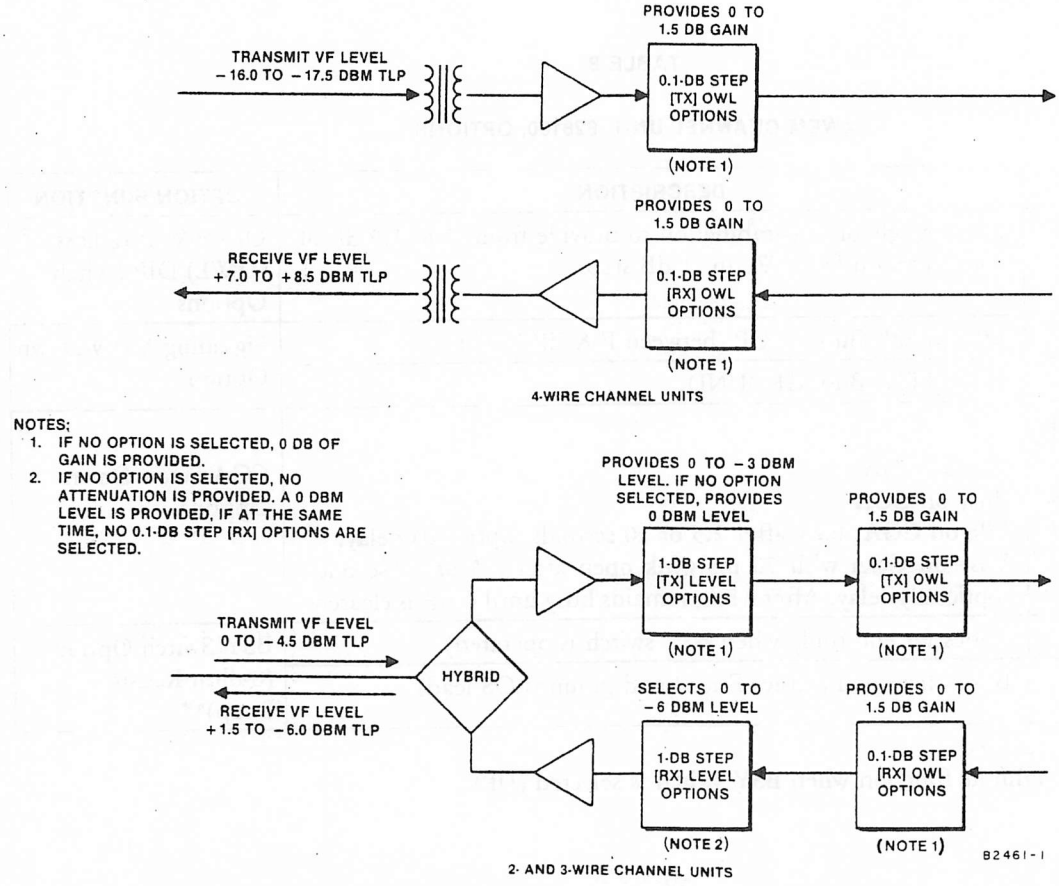
PROVIDES 0 TO 1.5 DB GAIN
TRANSMIT VF LEVEL −16.0 TO −17.5 DBM TLP
0.1-DB STEP [TX] OWL OPTIONS
(NOTE 1)
PROVIDES 0 TO 1.5 DB GAIN
RECEIVE VF LEVEL +7.0 TO +8.5 DBM TLP
0.1-DB STEP [RX] OWL OPTIONS
(NOTE 1)
4-WIRE CHANNEL UNITS
NOTES:
1. IF NO OPTION IS SELECTED, 0 DB OF GAIN IS PROVIDED.
2. IF NO OPTION IS SELECTED, NO ATTENUATION IS PROVIDED. A 0 DBM LEVEL IS PROVIDED, IF AT THE SAME TIME, NO 0.1-DB STEP [RX] OPTIONS ARE SELECTED.
PROVIDES 0 TO −3 DBM LEVEL. IF NO OPTION SELECTED, PROVIDES 0 DBM LEVEL
PROVIDES 0 TO 1.5 DB GAIN
1-DB STEP [TX] LEVEL OPTIONS
0.1-DB STEP [TX] OWL OPTIONS
(NOTE 1)
(NOTE 1)
TRANSMIT VF LEVEL 0 TO −4.5 DBM TLP
HYBRID
RECEIVE VF LEVEL +1.5 TO −6.0 DBM TLP
SELECTS 0 TO −6 DBM LEVEL
PROVIDES 0 TO 1.5 DB GAIN
1-DB STEP [RX] LEVEL OPTIONS
0.1-DB STEP [RX] OWL OPTIONS
(NOTE 2)
(NOTE 1)
2- AND 3-WIRE CHANNEL UNITS
B2461-1

Fig. 1—D448 Channel Unit Level Options, Block Diagram

vary significantly. A compromise network [CN] option provides a minimum impedance for matching purposes. If specific NBOC requirements are unknown, only this option is selected and all other NBOC DIP switch options ([2] through [64]) should be off. Additional capacitance is added in parallel across the compromise network by selecting options [2] through [64] as required.

4. CGA OPTIONS

4.01 CGA options provide a means of establishing the status (busy or idle) of a channel unit when a carrier group alarm occurs.

5. SIGNALING OPTIONS

5.01 Signaling options condition the signaling leads on certain channel unit types. Options are selected to match the requirements of the central office switching equipment.

6. BSY SWITCH OPTIONS

6.01 BSY switch options provide for altering the functions performed by the channel unit BSY switch when it is operated (up).

7. MISCELLANEOUS OPTIONS

7.01 Selected D448 channel units provide additional options for other special features or operating characteristics such as 2-/3-wire operation, integrity check, extended loop conditioning, or loop-start/ground-start operation.

8. INSTALLATION

8.01 After all options have been selected on a channel unit, the unit may be inserted into its assigned slot in the multiplex shelf. At this time, the channel is ready to be placed in service. However, if it is necessary to perform tests on the channel to meet local requirements, this testing should be performed at this time. Testing procedures for single-ended testing are provided in Section ITTR-18-443, and for end-to-end testing in Section ITTR-18-445.

9. OPTION SELECTION

9.01 Tables B through M and Fig. 2 through 13 show channel unit options and option locations for all standard D448 trunk channel units (628100 through 628190). Refer to ITTR-18-441 to select options on special service channel units (628200 through 628299).

TABLE B

4WEM CHANNEL UNIT, 628100, OPTIONS

OPTION			DESCRIPTION	OPTION FUNCTION
[RX]/[TX] .1, .2, .4, .8			Select singly or in combination to provide from .1 to 1.5 dB of compensation for OWL in .1 dB steps	Office Wiring Loss (OWL) DIP Switch Options
[E] UP			Idle-OPEN, Busy-LOOP (between E & EB leads)	Signaling Screw-Down Option
[E]* DN			Idle-OPEN, Busy-GROUND	
[EG]	**[W]**	**[K]**		
UP	UP	UP	Idle on CGA.	CGA Screw-Down Options
UP	UP	DN	Busy on CGA.	
DN	UP	UP	Idle on CGA, busy after 2.5 or 10 seconds (optional) delay.	
UP	DN	UP	Busy on CGA with 70 ms wink open after 2.5 or 10 seconds (optional) delay. After wink, remains busy until CGA is cleared.	
[BF]*			Busies far end (only when BSY switch is operated).	BSY Switch Options (0-ohm Resistor Strap)**
[BN]*			Busies near end (busies E lead and grounds OS lead).	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

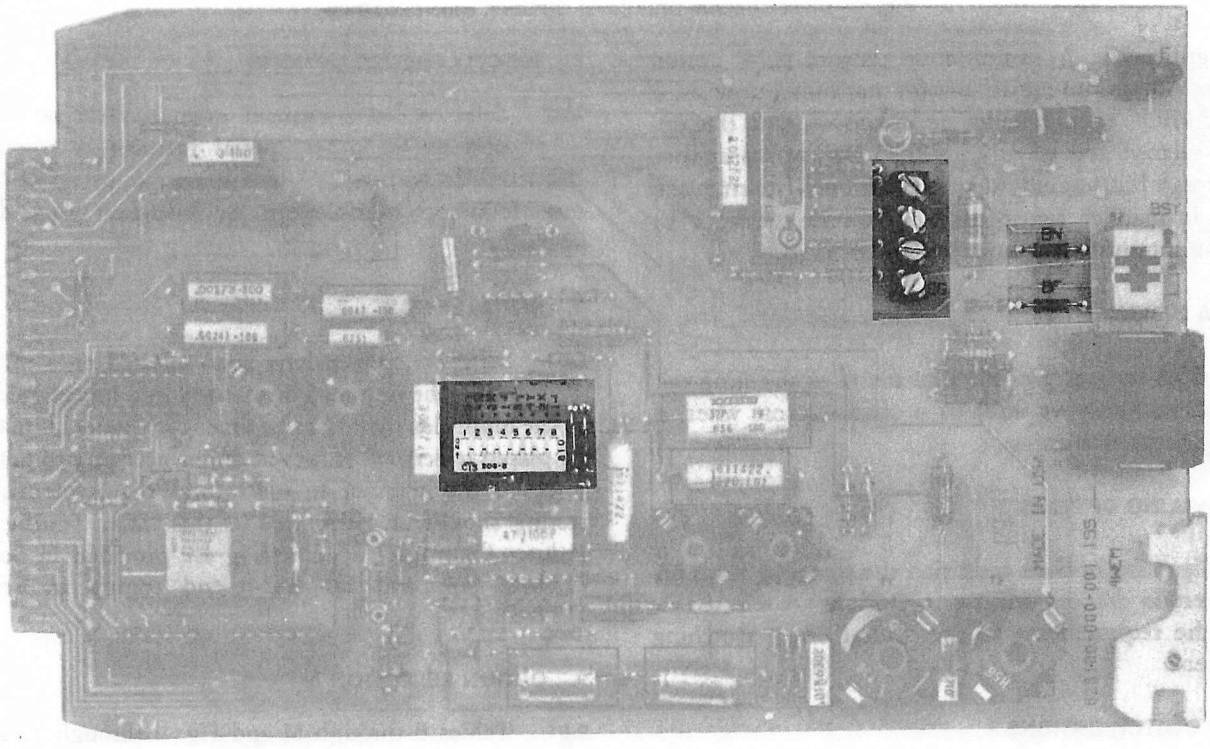

Fig. 2—4WEM Channel Unit, 628100, Option Locations

TABLE B1

2WEMG9 AND 2WEMG6 CHANNEL UNIT, 628121, OPTIONS

OPTION	DESCRIPTION	OPTION FUNCTION
[CN]*	Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32,64]	Provides built-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8	Provides from 0 to 1.5 dB of compensation for OWL in 0.1-dB steps.	Level DIP Switch Options
[TX] −1, −2, −3 −4, −5, −6	Provides from 0 to 6 dB of loss for TX VF levels in 1-dB steps.	
[RX] −1, −2, −3* −4, −5, −6	Provides from 0 to 6 dB of loss for RX VF levels in 1-dB steps.	
[E] EM/EMG*, [M] EM/EMG*	Conditions E/EB and M/MB leads for EM or EMG operation (in EMG position, conditions E/EB and M/MB leads for interface with an E&M unit).	EM/EMG Switch Options
[E1-1]* / **[E1-2]***		E/EB Lead Screw-Down Options
UP / UP	Idle-open, busy-loop (with [E] EM/EMG in either EM or EMG position).	
UP / DN	Idle-open, busy-battery (with [E] EM/EMG in EMG position).	
UP or DN / DN	Idle-open, busy-ground (with [E] EM/EMG in EM position).	
DN / DN	Idle-ground, busy-battery (with [E] EM/EMG in EMG position).	
[EG] / [W] / [K]		CGA Screw-Down Options
UP / UP / UP	Idle on CGA.	
UP / UP / DN	Busy on CGA.	
DN / UP / UP	Idle on CGA, busy after 2.5 or 10 seconds (optional) delay.	
UP / DN / UP	Busy on CGA with 70 ms wink open after 2.5 or 10 seconds (optional) delay. After wink, remains busy until CGA is cleared.	
[BF]**	Busies far end (only when BSY switch is operated).	BSY Switch Options (0-ohm Resistor Strap)
[BN]**	Busies near end (busies E lead and grounds OS lead) only when BSY switch is operated.	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

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Fig. 2A—2WEMG9 and 2WEMG6 Channel Unit, 628121, Option Locations

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TABLE C

2WEM9 AND 2WEM6 CHANNEL UNIT, 628120, OPTIONS

OPTION			DESCRIPTION	OPTION FUNCTION
[CN]*			Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]			Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8			Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3			Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6			Provides a range of 0 to −6 dB for RX VF levels	
[E] UP			Idle-OPEN, Busy-LOOP (between E & EB leads)	Signaling Screw-Down Option
[E]* DN			Idle-OPEN, Busy-GROUND	
[EG]	**[W]**	**[K]**		CGA Screw-Down Options
UP	UP	UP	Idle on CGA. Remains idle until CGA is cleared.	
UP	UP	DN	Busy on CGA. Remains busy until CGA is cleared.	
DN	UP	UP	Idle on CGA, busy after 2.5 or 10 seconds (optional) delay. Remains busy until CGA is cleared.	
UP	DN	UP	Busy on CGA with 70 ms wink open after 2.5 or 10 seconds (optional) delay. After wink, remains busy until CGA is cleared.	
[BF]*			Busies far end (only when BSY switch is operated).	BSY Switch Options (0-ohm Resistor Strap)**
[BN]*			Busies near end (busies E lead and grounds OS lead).	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

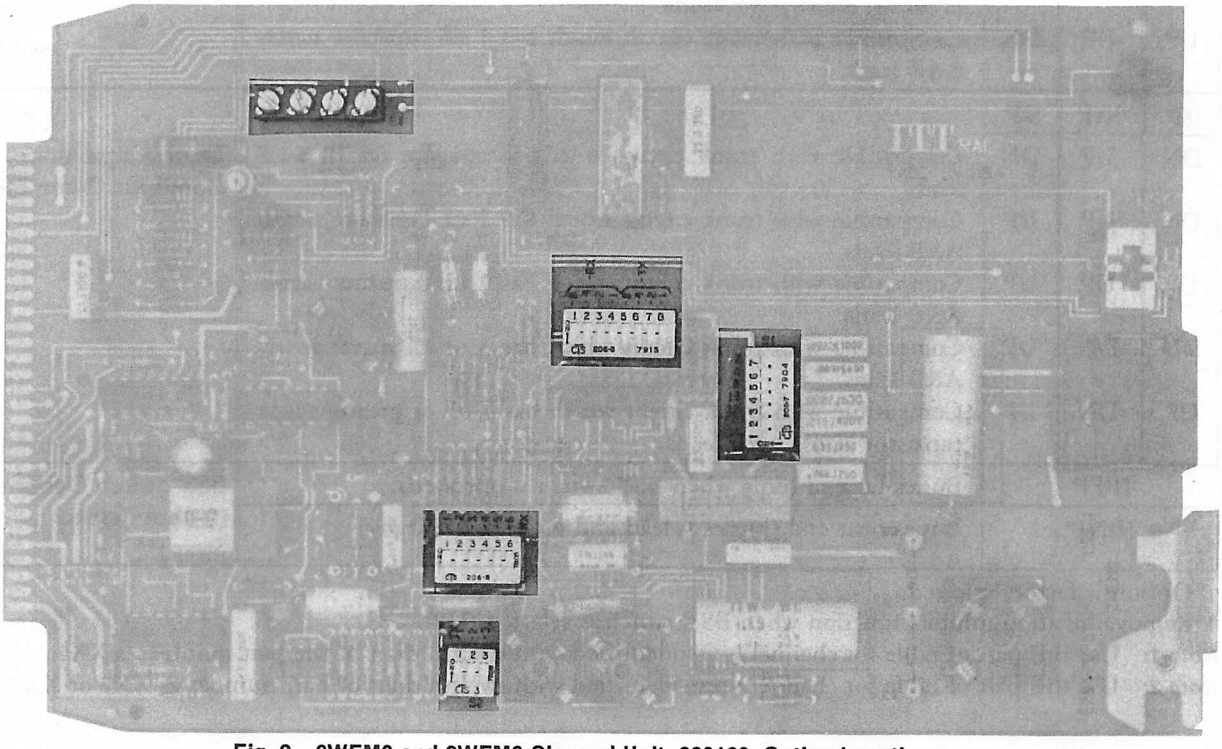

Fig. 3—2WEM9 and 2WEM6 Channel Unit, 628120, Option Locations

TABLE D

2WEM9A AND 2WEM6A CHANNEL UNIT, 628130, OPTIONS

OPTION			DESCRIPTION	OPTION FUNCTION
[CN]*			Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]			Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8			Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3			Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6			Provides a range of 0 to −6 dB for RX VF levels	
[E] UP			Idle-OPEN, Busy-LOOP (between E & EB leads)	Signaling Screw-Down Option
[E]* DN			Idle-OPEN, Busy-GROUND	
[EG]	**[W]**	**[K]**		CGA Screw-Down Options
UP	UP	UP	Idle on CGA. Remains idle until CGA is cleared.	
UP	UP	DN	Busy on CGA. Remains busy until CGA is cleared.	
DN	UP	UP	Idle on CGA, busy after 2.5 or 10 seconds (optional) delay. Remains busy until CGA is cleared.	
UP	DN	UP	Busy on CGA with 70 ms wink open after 2.5 or 10 seconds (optional) delay. After wink, remains busy until CGA is cleared.	
[X]*	**[Y]**	**[Z]**		Trunk Capacitance Condition (Note 1)
DN	UP	UP	Compatible with trunk circuit with no capacitor across A&B leads.	
UP	DN	UP	Compatible with trunk circuit which has 4 uF or greater value capacitor across A&B leads.	
UP	UP	DN	Compatible with trunk circuit which has 1 uF capacitor across A&B leads.	
[X]*	**[Y]**	**[Z]***		Trunk Capacitance Condition (Note 2)
DN	UP	DN	Compatible with trunk circuit with no capacitor across A&B leads.	
DN	UP	UP	Compatible with trunk circuit which has 1 uF capacitor across A&B leads.	
UP	UP	UP	Compatible with trunk circuit which has 2 uF capacitor across A&B leads.	
DN	DN	UP	Compatible with trunk circuit which has 3 uF capacitor across A&B leads.	
UP	DN	UP	Compatible with trunk circuit which has 4 uF or greater value capacitor across A&B leads.	
[BF]*			Busies far end (only when BSY switch is operated).	BSY Switch Options (0-ohm Resistor Strap)**
[BN]*			Busies near end (busies E lead and grounds OS lead).	

*Option is factory selected.

**Removal of strap inhibits function when BSY switch is selected (UP).

Note 1: Use this part of table for channel units identified with twelfth digit of the part number as XX1.

Note 2: Use this part of table for channel units identified with twelfth digit of part number as XX2 or XX3.

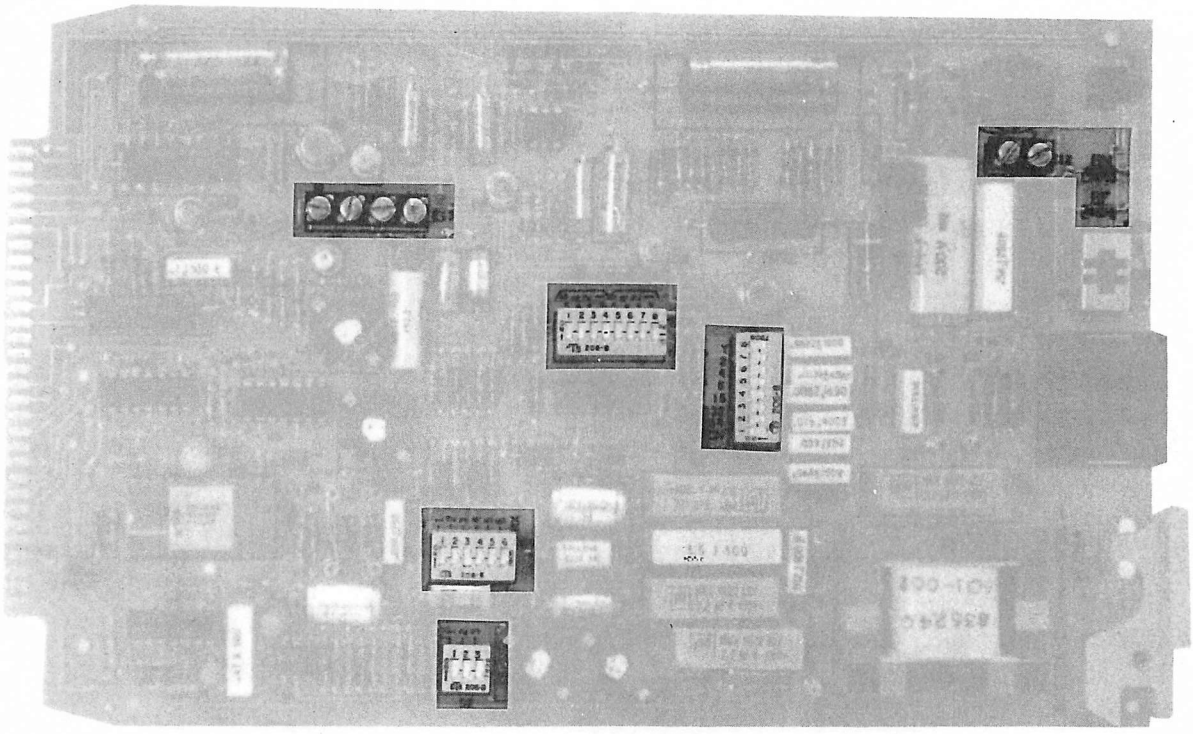

Fig. 4—2WEM9A and 2WEM6A Channel Unit, 628130, Option Locations

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TABLE E

DPO9 AND DPO6 CHANNEL UNIT, 628140, OPTIONS

OPTION	DESCRIPTION	OPTION FUNCTION
[CN]*	Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]	Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8	Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3	Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3*, −4, −5, −6	Provides a range of 0 to −6 dB for RX VF levels	
[BB]*	During CGA, after 2.5 or 10 seconds (optional) delay, reverse battery is applied to the TIP and RING leads (battery on TIP, ground on RING); operation of BSY switch also enables this function.	CGA Option (0-ohm Resistor Strap)**

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

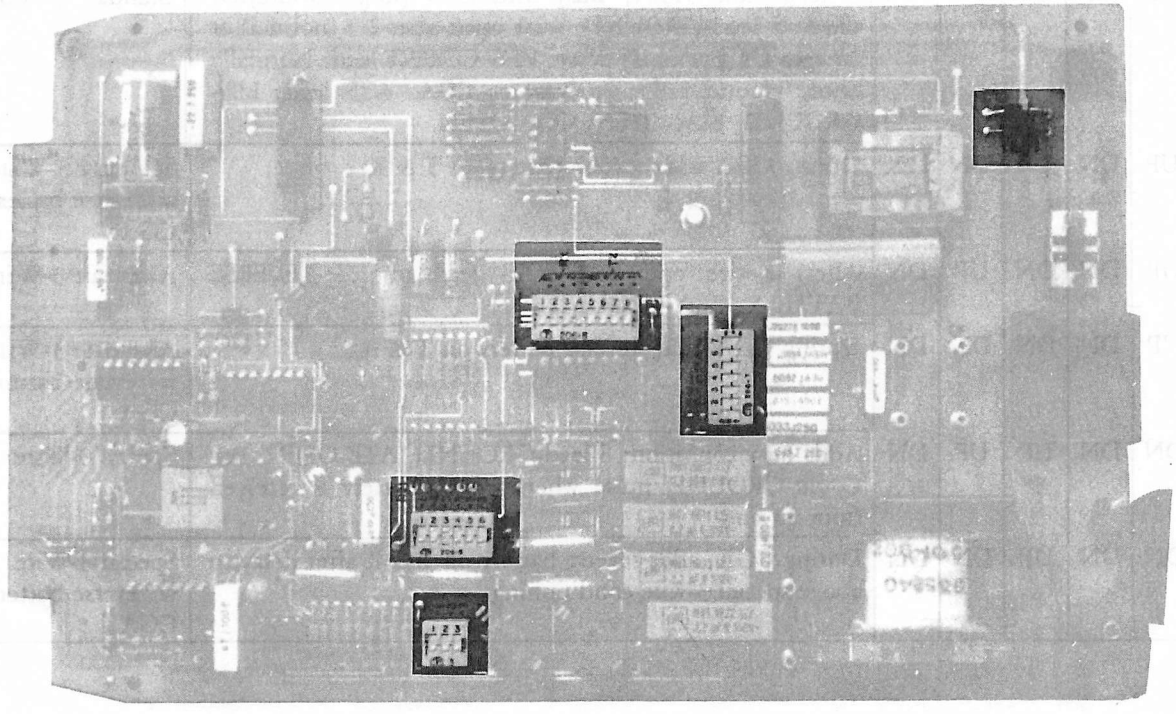

Fig. 5—DPO9 and DPO6 Channel Unit, 628140, Option Locations

TABLE F

SDPO9 AND SDPO6 CHANNEL UNIT, 628150, OPTIONS

OPTION	DESCRIPTION	OPTION FUNCTION
[CN]*	Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]	Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8	Provides 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3	Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6	Provides a range of 0 to −6 dB for RX VF levels	
[BN1]*	Supplies S lead and/or 1/2 busy conditions via relay K2	BSY Switch Option (0-ohm Resistor Strap)**
[BN2]*	Busies near end	

[H1]	[H2]		
UP	UP	HS lead open always.	HS Lead Conditioning
DN	UP	During CGA-Battery on HS ([BB] selected); Idle-resistive ground, Busy-Battery	
UP	DN	During CGA ground on HS lead ([BB] selected); Idle-Open; Busy-Ground	

[3W]*	[F]	[S]*	[W]	[BB]	[B]*		
DN	UP	DN	UP	UP	DN	S lead: Idle-OPEN; Busy-GROUND (loop closure).On CGA: S Lead-GROUND; wink open after 2.5 (normal) or 10 seconds (optional) delay. PEG COUNT lead: Normally open; ground pulse on busy or CGA. ATB lead: Idle-GROUND; Busy-OPEN; CGA-OPEN.	Standard 3-Wire
DN	UP	DN	UP	DN	DN	During CGA adds reverse battery on T & R	Standard 3-Wire w/reverse battery on CGA
DN	UP	DN	DN	UP	DN	Alters 3-wire operation of S lead to Idle-REVERSE BATTERY; Busy-GROUND	Alternate 3-Wire
DN	UP	DN	DN	DN	DN	During CGA, adds reverse battery on T & R	Alternate 3-Wire w/reverse battery on CGA
DN	DN	DN	UP	UP	DN	Adds busy condition: S lead-GROUND, ATB-OPEN, Peg Count-GROUND pulse when reverse battery is received from far end	Special 3-Wire
DN	DN	DN	UP	DN	DN	During CGA, adds reverse battery on T & R after delay to above special 3-wire conditioning	Special 3-Wire w/reverse battery on CGA

TABLE F (CONT)

OPTION						DESCRIPTION	OPTION FUNCTION
[B]	[UH]	[U1]	[U2]	[BB]			
DN	UP	UP	UP	DN		TIP-RING: Far-End Busy-REVERSE BATTERY; CGA-REVERSE BATTERY. 1/S & 2 leads: Idle-OPEN; CGA-LOOP; 1/S & 2 leads together with wink open after 2.5 or 10 seconds (optional) delay. ATB lead: Idle-GROUND; CGA-OPEN with wink to ground after 2.5 or 10 seconds (optional) delay.	Standard 2-Wire
DN	UP	UP	UP	UP		Alters standard 2-wire. TIP-RING: Far-End Busy-BATTERY; CGA-BATTERY.	Standard 2-Wire w/o reverse battery on CGA
UP	DN	DN	DN	DN		1/S & 2 leads: Idle-CLOSED; CGA-OPEN. 1/S grounded on CGA, winks open after 2.5 or 10 seconds (optional) delay. ATB lead: Idle-GROUND; CGA-OPEN. TIP-RING — same as standard 2-wire operation.	Special 2W/3W†
UP	DN	DN	DN	UP		Alters special 2W/3W. TIP-RING: Far-End Busy-BATTERY.	Special 2W/3W w/o reverse battery on CGA

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).
†Special 2W/3W is used for underhang applications where a sleeve repeating relay is in series with normally closed 1/S and 2 leads to provide the 3W S lead function.

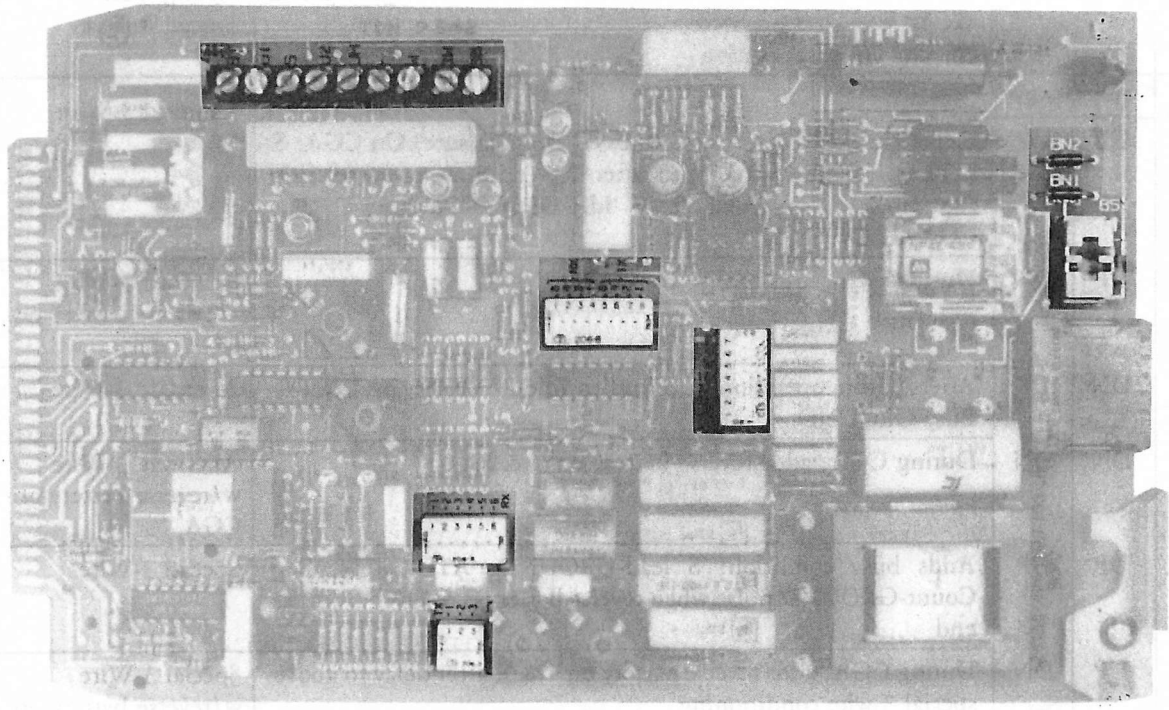

Fig. 6—SDPO9 and SDPO6 Channel Unit, 628150, Option Locations

TABLE G

SDPOC9 AND SDPOC6 CHANNEL UNIT, 628155, OPTIONS

OPTION			DESCRIPTION	OPTION FUNCTION
[CN]*			Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]			Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8			Provides 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3			Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6			Provides a range of 0 to −6 dB for RX VF levels	
[BN1]*			Supplies S lead and/or 1/2 busy conditions via relay K2	BSY Switch Option (0-ohm Resistor Strap)**
[BN2]*			Busies near end	
[H1]	**[H2]**			HS Lead Conditioning
UP	UP		HS lead open always.	
DN	UP		During CGA-Battery on HS ([BB] selected); Idle-resistive ground, Busy-Battery	
UP	DN		During CGA ground on HS lead ([BB] selected); Idle-Open; Busy-Ground	
[FR]				
DN			Applies resistive battery to S lead when a call is completed and the far end goes on hook	Calling Party Forced Release
UP			Normal S lead operation	
[F]	**[W]**	**[BB]***		Standard 3-Wire
UP	UP	UP	S lead: Idle-OPEN; Busy-GROUND (loop closure).On CGA: S Lead-GROUND; wink open after 2.5 (normal) or 10 seconds (optional) delay. ATB lead: Idle-GROUND; Busy-OPEN; CGA-OPEN.	
UP	UP	DN	During CGA adds reverse battery on T & R	Standard 3-Wire w/reverse battery on CGA
UP	DN	UP	Alters 3-wire operation of S lead to Idle-REVERSE BATTERY; Busy-GROUND	Alternate 3-Wire
UP	DN	DN	During CGA, adds reverse battery on T & R	Alternate 3-Wire w/reverse battery on CGA
DN	UP	UP	Adds busy condition: S lead-GROUND, ATB-OPEN, Peg Count-GROUND pulse when reverse battery is received from far end	Special 3-Wire
DN	UP	DN	During CGA, adds reverse battery on T & R after delay to above special 3-wire conditioning	Special 3-Wire w/reverse battery on CGA

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

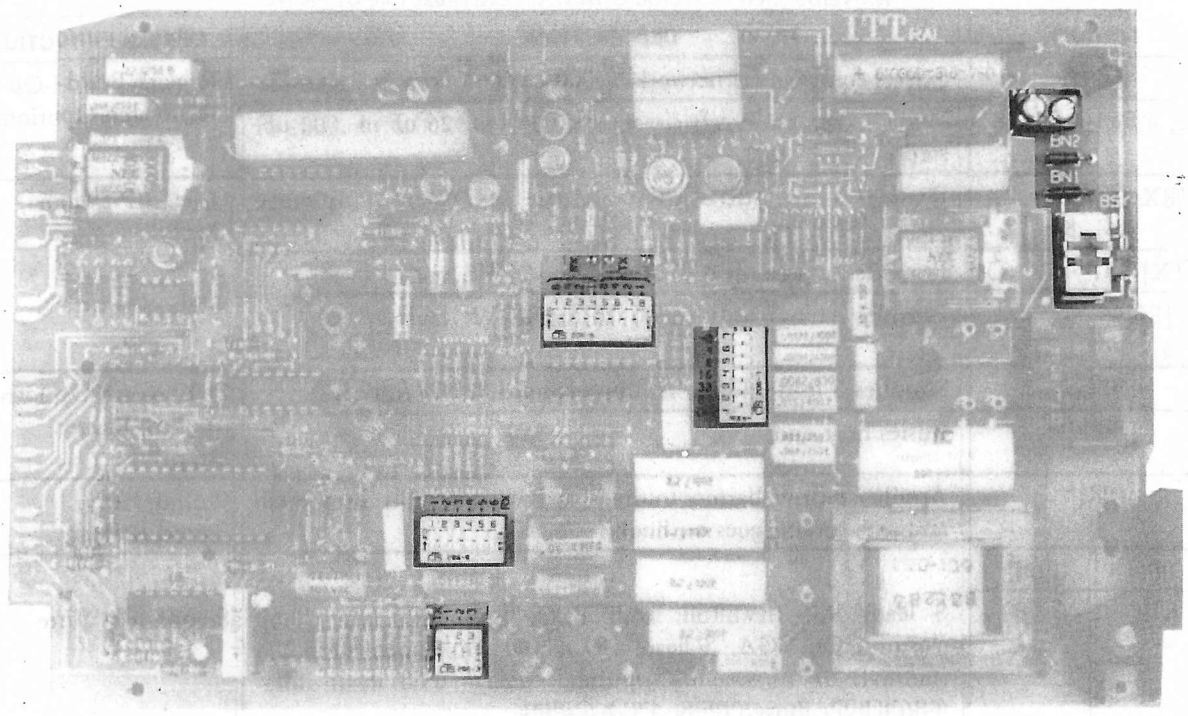

Fig. 7—SDPOC9 and SDPOC6 Channel Unit, 628155, Option Locations

TABLE H

NX-1E/D9 AND NX-1E/D6 CHANNEL UNIT, 628156, OPTIONS

OPTION		DESCRIPTION	OPTION FUNCTION
[CN]*		Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]		Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8		Provides 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3		Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6		Provides a range of 0 to −6 dB for RX VF levels	
[BN1]*		Supplies S lead and/or TM busy conditions via relay K2	BSY Switch Option (0-ohm Resistor Strap)**
[BN2]*		Busies near end	
[FR]*		Applies resistive battery to the S lead when a call is completed and the far end goes on hook.	Calling Party Forced Release
[F]	[BB]*		
UP	UP	S lead: Idle-REVERSE BATTERY; Busy-GROUND (loop closure). On CGA: S Lead-GROUND; wink open after 2.5 (normal) or 10 seconds (optional) delay. ATB lead: Idle-GROUND; Busy-OPEN; CGA-OPEN.	Standard 3-Wire
UP	DN	During CGA adds reverse battery on T & R	Standard 3-Wire w/reverse battery on CGA
DN	UP	Adds busy condition: S lead-GROUND, ATB-OPEN.	Special 3-Wire
DN	DN	During CGA, adds reverse battery on T & R after delay to above special 3-wire conditioning	Special 3-Wire w/reverse battery on CGA

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (up).

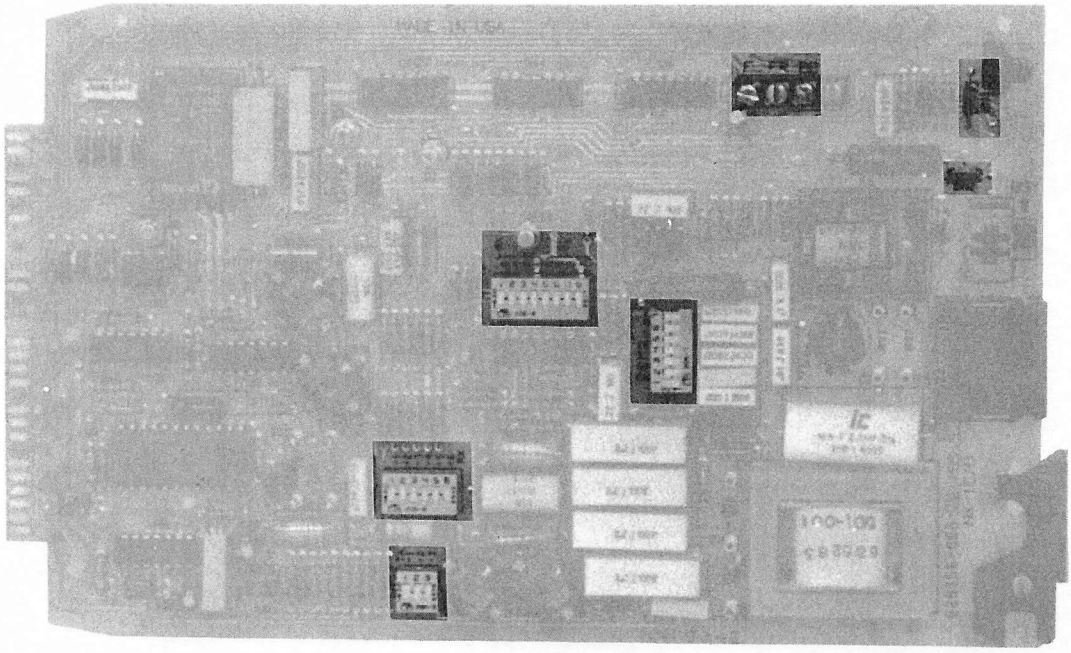

Fig. 8—NX-1E/D9 and NX-1E/D6 Channel Unit, 628156, Option Locations

TABLE I

DPT9 AND DPT6 CHANNEL UNIT, 628160, OPTIONS

OPTION	DESCRIPTION	OPTION FUNCTION
[CN]*	Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]	Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8	Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3	Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3*, −4, −5, −6	Provides a range of 0 to −6 dB for RX VF levels	
[BF]*	Busies far end (only when BSY switch is operated).	BSY Switch Option (0-ohm Resistor Strap)**

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

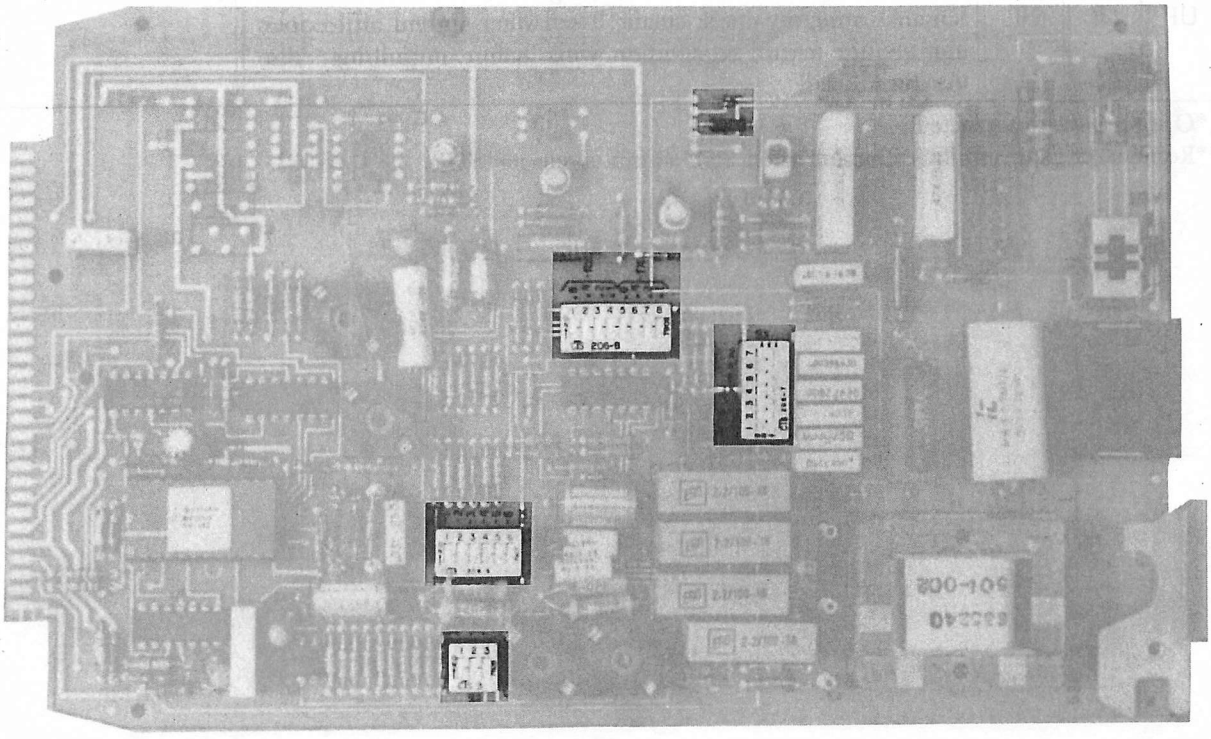

Fig. 9—DPT9 and DPT6 Channel Unit, 628160, Option Locations

TABLE J

DPT9I AND DPT6I CHANNEL UNIT, 628170, OPTIONS

OPTION			DESCRIPTION	OPTION FUNCTION
[CN]*			Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]			Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8			Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3			Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6			Provides a range of 0 to −6 dB for RX VF levels	
[BF]*			Busies far end.	BSY Switch Option (0-ohm Resistor Strap)**
[CI]	[TI]	[S]		Integrity Check Screw-Down Options
DN*	UP	UP	Provides return supervision (150-ms wink pulse) to far-end office.	
UP	DN	UP	Provides return supervision (150-ms wink pulse) to far-end office when S lead is grounded.	
UP	UP	DN	Busies TX direction when S lead is grounded.	
UP	UP	UP	Disables integrity check circuit. Used when far-end office does not require return supervision wink before outpulsing. Also disables S lead.	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

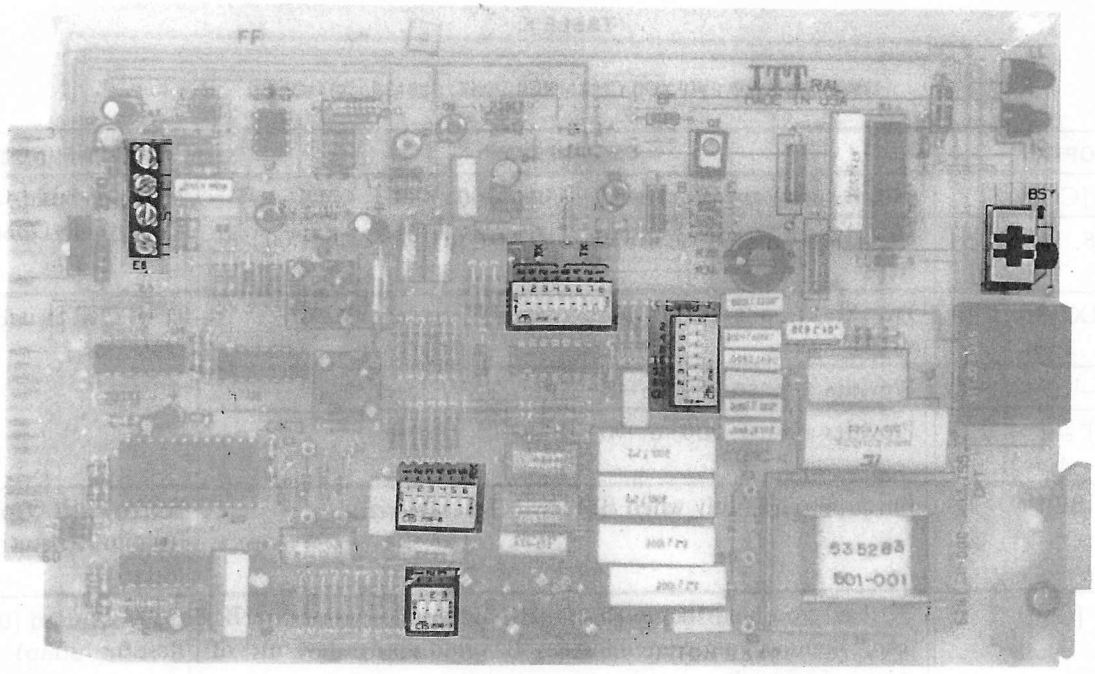

Fig. 10—DPT9I and DPT6I Channel Unit, 628170, Option Locations

TABLE K

2WFXO9 AND 2WFXO6 CHANNEL UNIT, 628180, OPTIONS

OPTION		DESCRIPTION	OPTION FUNCTION
[CN]*		Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]		Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8		Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3		Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6		Provides a range of 0 to −6 dB for RX VF levels	
[BF]*		Busies far end (only when BSY switch is selected).	BSY Switch Option (0-ohm Resistor Strap)**
[G]*		B2 lead grounded. Loop closure (B1-B2) applies ground to B1 lead. Removal of strap removes B2 ground to allow use of external ground.	CGA Option (0-ohm Resistor Strap)
[LS]		Conditions for loop-start operation. (When UP, unit is conditioned for ground-start.)	Loop-/Ground-Start Signaling Conditioning
[LX1]	**[LX2]**		
DN	DN	Changes loop resistance presented to C.O. from 600 ohms (normal) to 100 ohms. Used only for long loops. May degrade return loss.	Extended Loop Conditioning
UP	UP	Presents normal (600-ohm) loop to C.O.	
[D2]	**[D3]***		
DN	UP	Conditions channel for D2-type signaling (select both [D2] option screws)	Signaling Lead Conditioning
UP	DN	Conditions channel for D1D/D3-type signaling (select both [D3] option screws)	
[W]	**[EG]**		
DN	UP	B1 and B2 leads: On CGA, loop closure, wink open after 2.5 or 10 seconds (optional) delay.	CGA Busy Lead Options
UP	DN	B1 and B2 leads: On CGA, loop closure after 2.5 or 10 seconds (optional) delay.	
[RG]	**[LC]**		
DN	UP	Ring-GROUND: 2.5 or 10 seconds (optional) delay after CGA.	Loop-/Ground-Start CGA Conditioning
UP	DN	Loop closure 2.5 or 10 seconds (optional) delay after CGA.	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

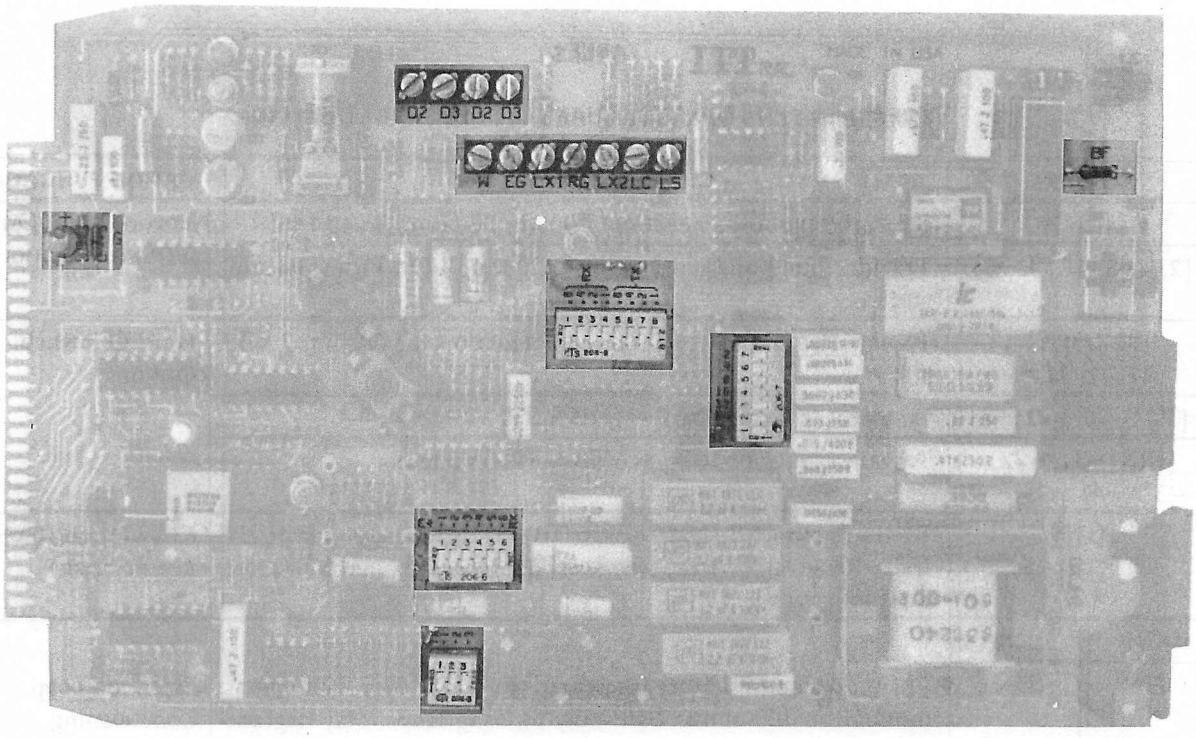

Fig. 11—2WFXO9 and 2WFXO6 Channel Unit, 628180, Option Locations

TABLE L

2WFXO/LS9 AND 2WFXO/LS6 CHANNEL UNIT, 628184, OPTIONS

OPTION		DESCRIPTION	OPTION FUNCTION
[CN]*		Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]		Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8		Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3		Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3,* −4, −5, −6		Provides a range of 0 to −6 dB for RX VF levels	
[G]*		B2 lead grounded. Loop closure (B1-B2) applies ground to B1 lead. Removal of strap removes B2 ground to allow use of external ground.	CGA Option (0-ohm Resistor Strap)
[LX1]	**[LX2]**		
DN	DN	Changes loop resistance presented to C.O. from 600 ohms (normal) to 100 ohms. Used only for long loops. May degrade return loss.	Extended Loop Conditioning
UP	UP	Presents normal (600-ohm) loop to C.O.	
[D2]	**[D3]***		
DN	UP	Conditions channel for D2-type signaling (select both [D2] option screws)	Signaling Lead Conditioning
UP	DN	Conditions channel for D1D/D3-type signaling (select both [D3] option screws)	
[W]	**[EG]**		
DN	UP	B1 and B2 leads: On CGA, loop closure, wink open after 2.5 or 10 seconds (optional) delay.	CGA Busy Lead Options
UP	DN	B1 and B2 leads: On CGA, loop closure after 2.5 or 10 seconds (optional) delay.	
[LC]			
UP		Loop closure will not occur when CGA delay lead is grounded.	Loop-/Ground-Start CGA Conditioning
DN		Loop closure occurs 2.5 or 10 seconds (optional) delay after CGA.	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

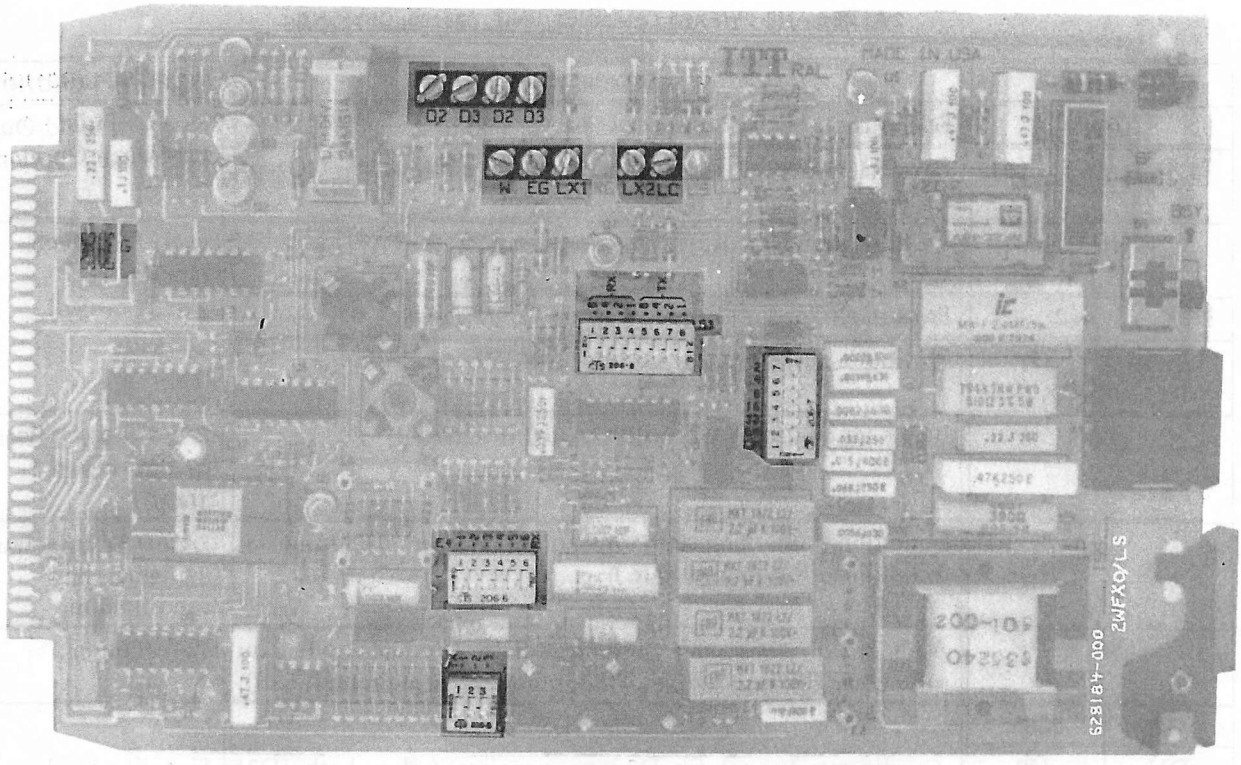

Fig. 12—2WFXO/LS9 and 2WFXO/LS6 Channel Unit, 628184, Option Locations

TABLE M

2WFXS9 AND 2WFXS6 CHANNEL UNIT, 628190, OPTIONS

OPTION		DESCRIPTION	OPTION FUNCTION
[CN]*		Selects compromise network of 900 or 600 ohms + 2.16 uF	Network Build-Out DIP Switch Options
[2, 4, 8, 16, 32, 64]		Provides build-out capacitance of .002 to .126 uF in .002 uF steps	
[RX]/[TX] .1, .2, .4, .8		Provides from 0 to 1.5 dB of compensation for OWL in .1 dB steps	Level DIP Switch Options
[TX] −1, −2, −3		Provides a range of 0 to −3 dB for TX VF levels	
[RX] −1, −2, −3*, −4, −5, −6		Provides a range of 0 to −6 dB for RX VF levels	
[BF]*		Busies far end (only when BSY switch is selected).	BSY Switch Option (0-ohm Resistor Strap)**
[LS]		Conditions for loop-start operation. (When UP, unit is conditioned for ground-start.)	Loop-/Ground-Start Signaling Conditioning
[BB]*		After 2.5 or 10 seconds (optional) delay, ground applied to subscriber TIP lead. (When UP, ground application inhibited.)	CGA Option
[D2]	**[D3]***		
DN	UP	Conditions channel for D2-type signaling (select both [D2] option screws)	Signaling Lead Conditioning
UP	DN	Conditions channel for D1D/D3-type signaling (select both [D3] option screws)	

*Option is factory selected.
**Removal of strap inhibits function when BSY switch is selected (UP).

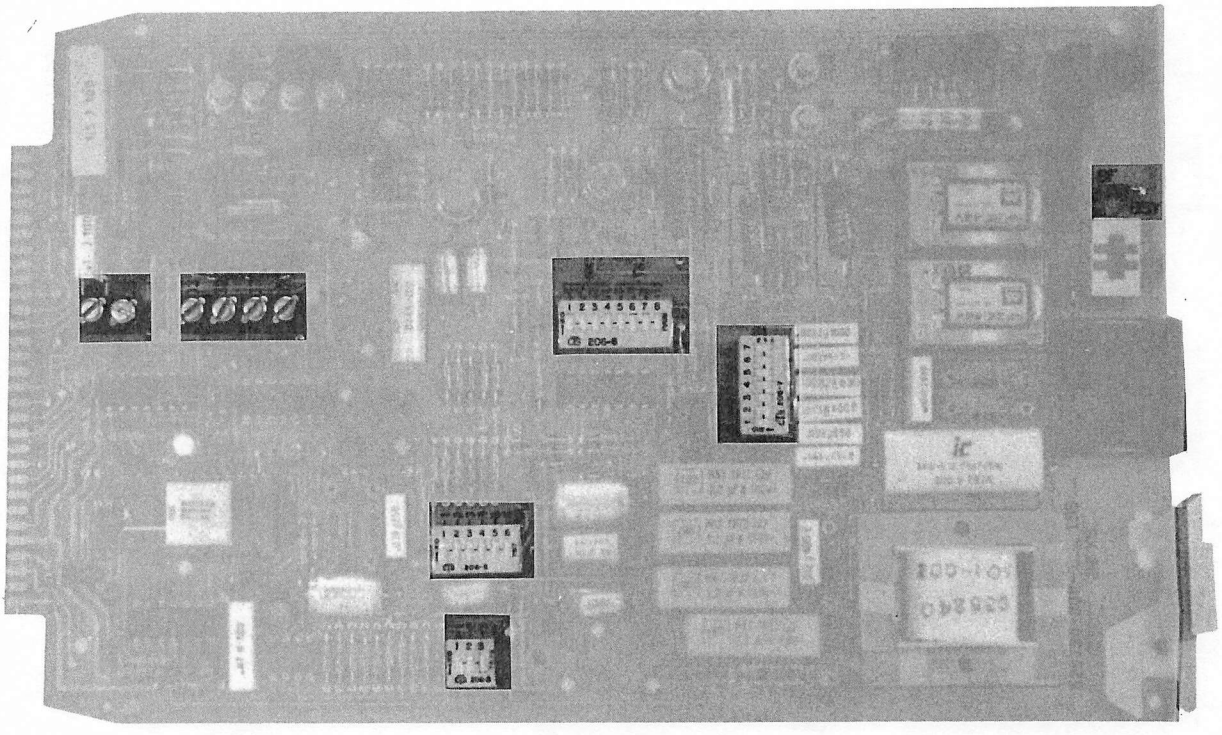

Fig. 13—2WFXS9 and 2WFXS6 Channel Unit, 628190, Option Locations